REMARKS

Claims 27, 28, 32, 33, 38, 39, 43, 44, and 49-69 are pending in this application. Claims 27, 28, 38, and 39 have been amended to address the Examiner's concerns regarding antecedent basis for certain claim terms. None of these amendments narrows the scope of the claims. Dependent claims 65-69 have been added to recite that the viral genome is HIV-1. Support for this amendment can be found throughout the specification, including, for example, at page 3, lines 24-31. This Amendment does not introduce new matter into the specification.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Office rejected claims 27, 28, 32, 33, 38, 39, 43, 44, and 49-64 under 35 U.S.C. § 112, second paragraph, as indefinite based on alleged insufficiencies regarding antecedent basis. (Paper No. 18, p. 6.) As noted in section 2173.05(e) of the M.P.E.P.:

> [T]he failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite. *Ex parte Porter*, 25 USPQ2d 1144, 1145 (Bd. Pat. App. & Inter. 1992) ("controlled stream of fluid" provided reasonable antecedent basis for "the controlled fluid"). Inherent components of elements recited have antecedent basis in the recitation of the components themselves. For example, the limitation "the outer surface of said sphere" would not require an antecedent recitation that the sphere has an outer surface. *See Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1359, 61 USPQ2d 1216, 1218-19 (Fed. Cir 2001) (holding that recitation of "an ellipse" provided antecedent basis for "an ellipse having a major diameter" because "[t]here can be no dispute that mathematically an inherent characteristic of an ellipse is a major diameter").

With this in mind, applicants will now address the allegedly indefinite terms identified by the Office.

1. nucleotide sequence

The Office noted that the claims recite "nucleotide sequence" followed by "nucleic acid." (Paper No. 18, p. 6.) Although in this context the terms "nucleotide sequence" and "nucleic acid" can be used interchangeably, to maintain consistency, applicants have replaced the term "nucleic acid" with "nucleotide sequence" in independent claims 27, 28, 38, and 39. This amendment does not narrow the scope of the claims.

2. primers

The Office rejected the claims for using the terms "said first primer" and "said second primer" without first reciting that there is "a first primer" or "a second primer." (Paper No. 18, p. 6.) Applicants respectfully traverse this rejection. The claims recite amplifying the nucleotde sequence with "at least two primers." If there are at least two primers, as claimed, it is inherent that there is at least a first primer and a second primer. "Inherent components of elements recited have antecedent basis in the recitation of the components themselves." M.P.E.P. § 2173.05(e). Thus, the meaning of the terms "said first primer" and "said second primer" is reasonably ascertainable from the context of the claim. *See id.* Accordingly, applicants respectfully request that this rejection be withdrawn.

3. genome

The Office objected to the claims for using the term "said nucleic acid genome" when the claims recite "a viral genome." (Paper No. 18, p. 6.) Applicants are confused as the term "said nucleic acid genome" does not appear in the claims. While, the claims

do recite the term "said genome," it is clear from the context that this refers back to "a viral genome," which is recited earlier in the claim. Nevertheless, to expedite prosecution, applicants have amended claims 27, 28, 38, and 39 to recite "said viral genome," thereby making explicit what was already implicit in the claims.

4. complementary strands

Finally, the Office noted that the claims recite "said complementary strands" yet "only make[ ] reference to a single strand before." (Paper No. 18, p. 6.) The claims recite a "strand of DNA complementary to said nuceic acid." As recited in these claims, if there is a strand of complementary DNA, this strand is inherently complementary to another nucleic acid, and hence the term "complementary." In other words, the complementary strand is the complement of a first nucleic acid strand. Together, these two strands make up "said complementary strands." Thus, given the recitation of a "strand of DNA complementary to said nucleic acid," the meaning of the following term, "said complementary strands," is reasonably ascertainable by those skilled in the art. *See* M.P.E.P. § 2173.05(e). Nevertheless, in an effort to expedite prosecution, applicants have amended the claims by deleting the phrase "when said complementary strands are hybridized to form one double-stranded nucleic acid," thereby eliminating the phrase that prompted this rejection. This amendment does not narrow the scope of the claims.

Rejections Under 35 U.S.C. § 112, First Paragraph

1. Written Description

The Office maintained the written description rejection of claims 27, 28, 32, 33, 38, 39, 43, 44 and newly added claims 49-64 under 35 U.S.C. § 112, first paragraph, for the reasons of record. (Paper No. 18, p. 2.) Applicants respectfully traverse this rejection.

a. The Pending Product By Process Claims

The pending claims are directed to viral polypeptides. In independent claims 27, 28, 38, and 39, the claimed polypeptides are expressed by a process comprising a) using primers to amplify a nucleic acid encoding the polypeptide, b) introducing the amplified nucleic acid into a vector, c) transforming a host cell with the vector, d) placing the transformed cell in culture, and e) expressing said polypeptide.

Applicants can perform this process because they identified certain nucleotide sequences that are conserved between different HIV and SIV strains. These sequences are insensitive to much, if any, variations in the genomes of different HIV and SIV isolates and, therefore, can be used as primers to amplify nucleic acids from different HIV-1, HIV-2, and SIV strains. These amplified nucleic acids share conserved sequences that correspond to the primers used to amplify them. When the amplified nucleic acids are translated into polypeptides, the polypeptides likewise share conserved sequences corresponding to the translated primer sequences. Thus, the amplified nucleic acids and the corresponding polypeptides encoded thereby possess common nucleic acid and polypeptide sequences, respectively, deriving from the conserved sequences of the primers initially used to amplify the nucleic acids.

b. The Specification Provides Written Description Support for the Pending Product By Process Claims Because the Recited Process Can Be Used to Produce the Claimed Polypeptides

As explained in the previous response filed August 25, 2003, the pending claims are product by process claims. The M.P.E.P. explains that "[w]here the process has actually been used to produce the product, the written description requirement for a product-by-process claim is clearly satisfied . . . ." M.P.E.P. § 2163, pp. 2100-163 - 2100-164. Conversely, "where it is not clear that the acts set forth in the specfication can be performed, or that the product is produced by the process[,]" the written description requirement may not be met. *Id.* Here, however, the evidence, including the specification, establishes that the process recited in the pending claims can be used to produce the product.[1] The Office never refutes this point.

As discussed in the previous response, the specification discloses the amplification of numerous nucleic acids using the primers recited in the claims. (Specification, pages 15-18.) It also teaches that such amplified sequences can be translated into polypeptides using well-known molecular biology and cloning techniques. (*See*, Specification, pp. 25-26; *see also*, J. Sambrook et al., *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratory Press, 16.1-17.44 (2nd Ed. 1989)[2].)

Absent sufficient evidence or reasoning to the contrary, a description as filed is presumed to be adequate. *See, e.g., In re Marzocchi*, 439 F.2d 220, 224, 169 USPQ 367, 370 (CCPA 1971). The Examiner, therefore, must have a reasonable basis to challenge the adequacy of the written description. M.P.E.P. § 2163.04. Here, there is

1 Exhibit 1 attached to this response provides further evidence that the process recited in the claims can be used to produce the claimed polypeptides from the HIV and SIV strains disclosed in the specification, as well as other HIV and SIV strains not specifically recited in the specification.
2 Submitted as Exhibit 2 in response dated August 25, 2003.

no evidence or reasoning to suggest that the process recited in the claims can not be performed or that the product is not produced by the process. Indeed, the Office has even acknowledged that applicants were in possession of the claimed sequences drawn to the specific viral strains disclosed in the specification, including HIV-1 Mal, HIV-1-Eli, HIV-1 Bru, HIV-2 Rod, and SIV-1 Mac. (Paper No. 18, p. 3.) While the Office asserts that "applicants were not in possession of yet undiscovered and mutated new [HIV-1, HIV-2, and SIV] viral strains as encompassed by the instant claims" (*Id.*), there is no evidence that the process recited in the claims could not be used to produce polypeptides from such HIV-1, HIV-2, and SIV strains.

Rather than address whether the process recited in the claims can be performed or whether the product is produced by the process, the Office sidesteps the issue and asserts, without support, that product by process claims may be proper "as long as the product-by-process results in the production of a single defined compound." (Paper No. 18, p. 3.) Applicants are not aware of any precedent that limits the scope of product by process claims to a single compound. Where, as here, the specification describes a process that can be used to produce the claimed compounds, the written description requirement has been satisfied.

c. The Specification Describes a Representative Number of Species and Discloses Relevant Identifying Characteristics of the Claimed Polypeptides

The Office asserts that "[t]he claims encompass a genus of compounds defined only be their method of obtaining the compound." (Paper No. 18, p. 3.) This is not true.

As noted in the M.P.E.P., the specification can also provide written description support for a claimed genus "through sufficient description of a representative number

of species, . . . or by disclosure of relevant, identifying characteristics, i.e., structures or other physical and/or chemical properties, . . . sufficient to show the applicant was in possession of the claimed genus." M.P.E.P. § 2163.

Here, the specification discloses a representative number of species, including HIV-1 Mal, HIV-1 Eli, HIV-1 Bru, HIV-2 Rod, and SIV-1 Mac. Furthremore, the specification provides written description of relevant identifying characteristics of the claimed polypeptides. As noted in the previous response, the process steps recited in the pending claims help to provide relevant information about the structural features of the claimed polypeptides. Specifically, the primers recited in the claims help define a structural region of the amplified nucleic acid sequence that is conserved between different HIV and SIV strains. These conserved sequences are retained when the amplified nucleic acids are translated into polypeptides. Thus, the claimed polypeptides share a common structural feature that is defined by the conserved primer sequences recited in the claims.

Even the Office acknowledges that "the primers define a common structural feature among the group of viruses . . . ." (Paper No. 18, p. 3.) But the Office asserts that "it is not the primers that are being claimed in the instant invention." (*Id.*) Rather the Office argues that "[t]he claims of the instant invention are drawn to the hypervariable region located between the primers, [and] it is this structure that does not meet the written description requirement of the instant invention." This analysis, however, does not comport with the proper written description inquiry.

The claimed invention is drawn to polypeptides. These polypeptides include amino acids encoded by nucleic acids that have been amplified using primer

sequences. The amplified nucleic acids include not only the region between the primers, but also the primer sequences themselves. Accordingly, when the amplified nucleic acids are translated into polypeptides, the resulting polypeptides have amino acid sequences corresponding to the conserved primer sequences, as well as amino acid sequences corresponding to the region of the amplified nucleic acid located between the primers. The regions of the polypeptide encoded by the conserved primer sequences define a common structural feature and an identifying characteristic of the claimed polypeptides and help provide written description support for the claimed invention. This identifying characteristic helps to describe the claimed invention so that one of skill in the art can recognize what is claimed.

By way of example, Exhibit 1 shows the conservation of the amino acid sequences encoded by the primers recited in the claims between HIV-1 Eli, HIV-1 Mal, HIV-1 Bru, as well as two additional HIV-1 strains, HIV-1 22 and HIV-1 ARV-2. These conserved amino acid sequences are common structural features and identifying characteristics of the claimed polypeptides.

The Office, however, overlooks these relevant, identifying characteristics of the claimed polypeptides and instead focuses on the region of the polypeptide encoded by the portion of the amplified nucleic acid located between the primers. The Office asserts that this so-called "hypervariable region" of the claimed polypeptide lacks written description support. (Paper No. 18, p. 3.) In essence, the Office ignores the conserved sequences in the claimed polypeptides and requires a complete amino acid by amino acid description of the remainder of the polypeptide. But the law does not impose such a written description requirement.

The Office must evaluate the claimed invention as a whole, including those identifying characteristics or common structural features that help define the claimed compounds and distinguish them from other compounds. As discussed above, the written description requirement may be satisfied by disclosure of relevant, identifying characteristics, such as structures or other physical and/or chemical properties, sufficient to show the applicant was in possession of the claimed genus. M.P.E.P. § 2163. That is exactly what applicants have done.

Furthermore, applicants' product-by-process claims are particularly appropriate in the situation here, where the nature of the invented product is such that it is difficult to define. *In re Pilkington*, 162 U.S.P.Q. 145, 148 (C.C.P.A. 1969) ("While we are satisfied that the references of record do not anticipate appellant's glass or demonstrate that it would be obvious, the differences between that glass and the glass of the prior art do not appear to us to be particulary susceptible to definition by the conventional recitation of properties or structure."); *In re Steppan*, 156 U.S.P.Q. 143, 147 (C.C.P.A. 1967) (reversing rejection of product-by-process claim, in part, because "the effect of the conditions imposed is that the right to claim 25 is being improperly denied solely because of the limitations of the English language.") With respect to the "hypervariable region," based on applicants' disclosure, one of skill in the art would have recognized that the sequences between the conserved primer sequences would possess a certain amount of variability among different viral strains. Indeed, it is this variability that gives rise to and distinguishes the different strains in the first place. Thus, given the expectation of variability within the region between the primers, one of ordinary skill in the art would have recognized that applicants' were in possession of the sequences

amplified by the recited primers and the resulting translation products, even if applicants did not know the entire amino acid sequence of the translated viral polypeptide. This is particularly true here where the evidence, including the specification, establishes that the process recited in the pending claims can be used to obtain the claimed polypeptide.

Accordingly, for the reasons discussed above, applicants respectfully request withdrawal of this 35 U.S.C. § 112, first paragraph, written description rejection.

2. Enablement

The Office also maintained the rejection of claims 27, 28, 32, 33, 38, 39, 43, 44 and newly added claims 49-64 under 35 U.S.C. § 112, first paragraph, alleging that the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. (Paper No. 18, pp. 4-6.) Applicants respectfully traverse this rejection.

As discussed in the previous response, the Office has the initial burden of establishing a *prima facie* case of lack of enablement. (M.P.E.P. § 2164.04.) Applicants' specification disclosing how to make and use the claimed invention must be taken as complying with 35 U.S.C. § 112, first paragraph, unless there is reason to doubt the objective truth of the disclosure. *In re Brana*, 51 F.3d 1560, 1566 (Fed. Cir. 1995). The Office has questioned the enablement provided by applicants' specification but has not given any technical reasons to support the rejection. The Office has provided no reasoning or evidence to suggest that a skilled artisan could not make the claimed polypeptides using the process steps recited in the pending claims. Nor has the Office provided any analysis of the eight *Wands* factors to support this rejection.

(*See* M.P.E.P. § 2164.01(a).) Thus, for the reasons already of record, the Office has not met its initial burden in establishing a *prima facie* case of nonenablement.

In support of this enablement rejection, the Office cites *Genentech v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997), and asserts that "[a] patent specification that provides only a starting point or direction for further research is not enabling because it does not provide full and clear terms that teach others how to make and use an invention that will be discovered sometime in the future." (Paper No. 18, p. 5.) This application, however, provides much more than a starting point for further research and is clearly distinguishable from *Genentech*.

Genentech's patent claimed a method for producing recombinant human growth hormone ("hGH") as a conjugate with a second protein (i.e., a "fusion protein") and then using an enzyme to cleave off the undesired portion. *Genentech*, 108 F.3d at 1363. The sequence of hGH was disclosed in the patent. According to the court, however, the specification of the Genentech patent did not:

> describe in any detail whatsoever how to make hGH using cleavable fusion expression. For example, no reaction conditions for the steps needed to produce hGH are provided; no description of any specific cleavable conjugate protein appears. The relevant portion of the specification merely describes three (or perhaps four) applications for which cleavable fusion expression is generally well suited and then names an enzyme that might be used as a cleavage agent (trypsin), along with sites at which it cleaves ("arg-arg or lys-lys, etc."). Thus, the specification does not describe a specific material to be cleaved or any reaction conditions under which cleavable expression would work.

Id. at 1365.

By contrast, applicants' specification describes in detail reaction conditions that can be used for producing the claimed polypeptides. The specification also discloses starting materials, including primer sequences. In addition, the specification includes working examples where applicants used various combinations of primers to amplify different regions of the viral genomes of HIV-1 Mal, HIV-1 Eli, HIV-1 Bru, HIV-2 Rod, and SIV-1 Mac. The amplified nucleic acids can then be routinely expressed as polypeptides using conventional molecular biology and cloning techniques. This is a far cry from *Genentech*, where the specification disclosed neither the reaction conditions for producing the fusion protein nor the fusion protein itself. Thus, *Genentech* is inapposite.

The Office recognizes that "Applicant's were in possession of the claimed sequences disclosed drawn to the specific viral strains disclosed in the specification HIV-1 Mal, HIV-1-Ely [sic, Eli], HIv-1 Bru, HIV-2 Rod (CNCM No. I-522) and SIV1-lac (CNCM No. I-521)" and that the specification discloses working examples and the structure of proteins from these five viral strains.[3] (Paper No. 18, pp. 2-3, 5.) Thus, despite maintaining these § 112 rejections against all pending claims, the Office appears to take the position that the specification only enables those species that have been expressly itemized. (*Id.* at 5.) It is well settled, however, even in the unpredictable arts, that section 112, first paragraph, does not require disclosure of every species encompassed by the claims. *See In re Angstadt*, 190 U.S.P.Q. 214, 218 (C.C.P.A. 1976). As observed by the court in *Angstadt*:

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3 Despite this recognition, the Examiner continues to maintain the 35 U.S.C. § 112, first paragraph, rejections of dependent claims 49-64, which recite that the viral strain is HIV-1 Bru, HIV-1 Mal, HIV-1 Eli, HIV-2 ROD, or SIV-1 MAC, or some subset thereof.

> To require such a complete disclosure would apparently necessitate a patent application or applications with "thousands" of examples[.] More importantly, such a requirement would force an inventor seeking adequate patent protection to carry out a prohibitive number of actual experiments. This would tend to discourage inventors from filing patent applications in an unpredictable area since the patent claims would have to be limited to those embodiments which are expressly disclosed.

Id. Thus, even in the unpredictable arts, section 112, first paragraph, does not require disclosure of every species encompassed by the claims. *In re Angstadt*, 190 U.S.P.Q. at 218.

Since applicants have disclosed a representative number of species and described routine methods for identifying additional species, they have adequately enabled the pending claims. As in *Angstadt*, requiring disclosure of every species encompassed by the claims would force the inventors to carry out a prohibitive number of actual experiments and would discourage the filing of patent applications, thereby conflicting with the patent system's goal of public disclosure. Therefore, 35 U.S.C. § 112, first paragraph, does not require an exhaustive disclosure of every species encompassed by the pending claims.

For the reasons discussed above, and the reasons already of record, applicants respectfully request that this enablement rejection be withdrawn.

CONCLUSION

In view of the foregoing remarks, applicants respectfully request the reconsideration and reexamination of this application and the timely allowance of the pending claims.

If there is any fee due in connection with the filing of this paper, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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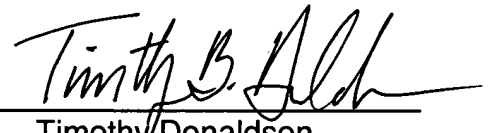
By: 
Timothy Donaldson
Reg. No. 43,592

Tel: (571) 203-2700
Fax: (202) 408-4400
Email: timothy.donaldson@finnegan.com